

Notice of Allowability

Application No.

10/064,980

Examiner

Brian R. Gordon

Applicant(s)

HILTON, BRIAN S.

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4-4-06.
2. ☒ The allowed claim(s) is/are 1-21.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 4, 2006 has been entered.

In view of applicant's amendment and arguments directed to the shutters of Hawkins et al., the previous art rejections are hereby withdrawn.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Klifton Kime on June 5, 2006.

The application has been amended as follows:

In the claims, amend the claims as follows:

1. A microelectromechanical system based fluid ejector, comprising:
an ejector nozzle;
a chamber that communicates with the ejector nozzle; and

a plurality of movable ejection structures associated with the ejector nozzle and arranged to individually move in the chamber, each of the ejection structures being configured to cause ejection of fluid from the associated ejector nozzle by moving, such that a variable volume of fluid is ejected from the associated ejector nozzle based on ~~individual~~ independent movement of the ejection structures.

5. The ejector of claim 1, further comprising a controller that independently actuates a corresponding actuator of each of the plurality of movable ejection structures independently.

12. A method for ejecting a fluid using a microelectromechanical system based fluid ejector having a chamber, an ejector nozzle and a plurality of movable ejection structures disposed in the chamber and associated with the ejector nozzle, the method comprising:

moving a first movable ejection structure within the chamber, the first movable ejection structure causing ejection of fluid from the associated ejector nozzle by the moving;

moving a second movable ejection structure within the chamber, the first movable ejection structure causing ejection of fluid from the associated ejector nozzle by the moving; and

~~individually controlling wherein the moving movement~~ of the first and second movable ejection structures ~~are~~ is independently controlled such that discrete drops or a continuous flow ~~a variable volume~~ of fluid is ejected from the associated ejector nozzle

based on ~~individual~~ the independent movement of the first and second movable ejection structures.

13. The method of claim 12, wherein controlling the ~~moving~~ movement of the first and second movable ejection structures is such that a continuous flow of fluid is ejected from the associated ejector nozzle.

15. The method of claim 12, wherein controlling the ~~moving~~ movement of the first and second movable ejection structures such that discrete drops of fluid having variable volumes ~~a variable volume~~ of fluid is are ejected from the associated ejector nozzle and the fluid is ~~comprises ejecting~~ a medical fluid.

17. The method of claim 12, wherein controlling the ~~moving~~ movement of the first and second movable ejection structures comprises controlling a plurality of actuators, each of the actuators being associated with one of the ejection structures.

18. The method of claim 12, wherein controlling the ~~moving~~ movement of the first and second movable ejection structures comprises electrostatically controlling the moving of the first and second movable ejection structures.

19. The method of claim 12, wherein controlling the ~~moving~~ movement of the first and second movable ejection structures comprises magnetically controlling the ~~moving~~ movement of the first and second movable ejection structures.

20. The method of claim 12, wherein controlling the ~~moving~~ movement of the first and second movable ejection structures comprises thermally controlling the ~~moving~~ movement of the first and second movable ejection structures.

21. The method of claim 12, further comprising independently actuating corresponding actuators of each of the plurality of movable ejection structures independently.

Allowable Subject Matter

2. Claims 1-21 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art of record does not teach nor fairly suggest the method and device as claim by applicant. Such as a microelectromechanical system based fluid ejector, comprising: an ejector nozzle; a chamber that communicates with the ejector nozzle; and a plurality of movable ejection structures associated with the ejector nozzle and arranged to individually move in the chamber, each of the ejection structures being configured to cause ejection of fluid from the associated ejector nozzle by moving, such that a variable volume of fluid is ejected from the associated ejector nozzle based on independent movement of the ejection structures.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Gordon whose telephone number is 571-272-1258. The examiner can normally be reached on M-F, with 2nd and 4th F off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to be 'EBR' followed by a long, sweeping horizontal stroke.

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